



## Optimizing Workflow and Treatment Quality at Carlo Fidani Peel Regional Cancer Center

### Executive summary

Inspiration™ is an integrated oncology solution that brings together all aspects of the clinical process into one easy-to-learn, easy-to-use system sharing a common user interface. Within the healthcare industry, an integrated, single-vendor solution provides a cohesive system in which people and technology can work together to streamline processes, improve resource management, and optimize patient care.

The objective of this paper is to show the various ways in which the Varian Inspiration Integrated Oncology Solution enables cancer treatment facilities to provide high-quality, high-volume care, onsite and remotely, in a paperless and filmless environment. We will show that by choosing a single-vendor, fully-integrated hardware/software solution, cancer treatment facilities can significantly improve process efficiencies within the radiation therapy department, including treatment protocols, resource management and utilization, and treatment assessment and care options, thus allowing more time to treat more patients without sacrificing treatment integrity.

## Introduction

The Inspiration Integrated Oncology Solution is comprised of best-of-breed components— treatment planning, simulation, information management, imaging, and treatment delivery—that support the delivery of best practices and enable cancer treatment facilities to become, through scalability and upgradability, early adopters of emerging technologies and treatment methodologies. This leading-edge approach provides a competitive advantage that allows facilities to remain at the forefront of oncology care.

## An Integrated Oncology Solution

Physicians are able to provide the highest level of patient care possible when they work as a team, each with full knowledge of a patient’s course of treatment. Within a radiation therapy department, Varian’s Inspiration integrated oncology solution serves an on-demand digital resource for entire patient records, beginning with admission and including treatment history, charts, images, and up-to-the-minute physician notes. All data is accessible from a single, unified database, eliminating the need to transfer or update information repeatedly across multiple systems.

An integrated solution enables the patient’s entire healthcare team—dosimetrists, physicists, radiation therapists, nursing staff, and designated others—to access and review the same continuously updated patient record at the point of care, remotely, or at a later time. Because the software is programmed to reflect a desired workflow, data moves logically through the clinical process, enabling staff to complete tasks more efficiently. Complex treatment plans can be developed, evaluated, and delivered in less time. Treatment review and approval cycles are shortened, and treatment modifications can be implemented on the spot.

An integrated solution also simplifies administrative duties by enabling consolidated reporting, to provide a unified view of a department’s performance and quality improvement. As service upgrades are introduced and components added, training efficiencies improve as well. Staff members need only to enhance previous learning instead of starting over or having to learn how disparate systems work together.

### Who Benefits

The Varian Inspiration Integrated Oncology Solution adds significant value to cancer treatment facilities seeking high-quality care options that allow them to keep pace with an ever-increasing patient population.

To that end, this paper will focus solely on the Carlo Fidani Peel Regional Cancer Center and the benefits derived from the facility’s use of the Varian Inspiration Integrated Oncology Solution.

The Carlo Fidani Peel Regional Cancer Center is the cornerstone of a comprehensive and world-class cancer program at Credit Valley Hospital, a GTA West Hospital located in Ontario, Canada. Creation of the 330,000 square foot multi-disciplinary facility, which opened in mid-2005, was a collaborative effort of Credit Valley Hospital, the Province of Ontario, Cancer Care Ontario, and the Region of Peel. The Peel Centre serves the greater Mississauga Area, including nearby regions of Peel, Halton, Dufferin, Simco, and Wellington.

### The advantages of an integrated Oncology solution

- Comprised of leading edge tools to support best practices
- Improves treatment process efficiencies
- Optimizes resource management and utilization
- All patient data is maintained in and accessible from a unified database
- Eliminates data transfer and updating across multiple systems
- Software programming aligns with facility treatment protocols/workflow
- Patient records may be accessed from any point-of-care workstation
- Complex treatment plans can be developed, evaluated, and delivered faster
- Common user interface connects every aspect of the clinical process
- Optimizes resource management and utilization
- Modifications to treatment regimens can be made on the spot
- Simplifies and accelerates QA
- Scalability and upgradability protect initial investment
- Implement emerging technologies in less time
- Minimal training to achieve user proficiency

The Peel Centre is one of the largest integrated oncology programs in the country, serving more patients than the busiest cancer centers in the United States. Services include related MRI diagnostics, oncology clinics, surgery, chemotherapy, and three radiation therapy suites, with the capability to expand to six. The facility provides, on average, more than 110 radiation treatments per day. Plans are already in the works to add a fourth radiation therapy suite to keep pace with the Peel Centre's growing patient population.

A multidisciplinary team of Peel Centre cancer treatment specialists also work collaboratively and remotely with partner oncology programs at the GTA West Hospitals: Trillium Health Centre, Halton Health Centre, William Osler Health Centre, and others.

### Setting the Criteria

**“As we continued to review the other components, it became clear that Varian was the only vendor that could provide a single, all-encompassing solution, one that would provide both a paperless and filmless environment, and allow us to avoid the all-too-well-known frustrations associated with trying to interface disparate systems.”**

– Dr. Ramani Ramaseshan, then Chief of Physics at the Peel Centre, and currently a Physics Team Leader at the British Columbia Cancer Agency in Surrey, British Columbia

Credit Valley Hospital is a progressive-minded healthcare facility that has long embraced the digital age, opting to forego paper and film, and, instead, rely solely on digital imagery for all forms of record keeping, patient and administrative.

In mid-2004, with construction of the Peel Centre well underway, a team of Credit Valley directors selected Varian Clinac 21EX Linear Accelerators, each equipped with a Millennium MLC-120 Multileaf Collimator and PortalVision, for use in the new facility's radiation therapy department.

Later that year, a committee comprised of Credit Valley and Peel Centre administrators, with input from key staff in radiation therapy, physics, and oncology, established criteria for selecting the patient management, work verification, and treatment planning software to be used in conjunction with the Varian hardware. Dr. Ramani Ramaseshan, then Chief of Physics at the Peel Centre, and currently a Physics Team Leader at the British Columbia Cancer Agency in Surrey, British Columbia, played an instrumental role in guiding the committee through the selecting process. “After reviewing multiple vendor product offerings, I provided the committee a report listing the pros and cons of the products before us. We then scored the items, based on our findings. The Varian 4D Integrated Treatment Console (4DITC), which is the software interface between the Clinac EX accelerators and the Eclipse Treatment Planning system, scored very high. As we continued to review the other components, it became clear that Varian was the only vendor that could provide a single, all-encompassing solution, one that would provide both a paperless and filmless environment, and allow us to avoid the all-too-well-known frustrations associated with trying to interface disparate systems.”

Dr. Tom McGowan, Director of Radiation Oncology at the Peel Centre, was also among those on the selection committee. According to Dr. McGowan, “Maintaining the same paperless and filmless environment as Credit Valley was our top priority. And if we were unable to open as a completely paperless facility, the consensus among committee members was that any initial use of paper recordkeeping would be temporary only.”

Dr. Ramaseshan concurred with Dr. McGowan, saying that going paperless and filmless was a matter of efficiency. “Paper charts change hands many times over the course of treatment; trying to locate a patient file can be an enormous waste of time and resources, for physicists, dosimetrists, oncologists, or anyone on their staff tasked with finding it. On top of that you have to consider the cost of acquiring and storing paper—before you even begin to use it. Once you create a paper chart, you need more space to store it, figure out where best to store it, and hire personnel to archive and retrieve it. It's an arduous process.”

Dr. Ramaseshan added that in a paperless and filmless environment, such as the one afforded by the Inspiration Solution, “The increased cost of adding IT support to maintain the database is considerably less than the costs associated with maintaining paper charts. By examining efficiencies is how we measure and quantify the benefits of a paperless and filmless process.”

### Vendor Selection Process

“As we reviewed multiple vendor applications,” said Dr. McGowan, “the committee agreed that all were excellent if taken singly, and all had their strengths and weaknesses, but it was the advantage of using a single integrated vendor that spoke volumes to us. Having a fully integrated system meant that all interface problems would be dealt with collectively, by one vendor. There would never be one vendor saying of another ‘It’s not our issue, it’s their issue.’”

Sarah Etheridge, Manager of Radiation Therapy at the Peel Centre, and cohort of Dr. McGowan, added, “Choosing a fully integrated solution would not only afford us a paperless environment, but also create a seamless environment in which we could see all aspects of the treatment plan, and treatment processes from anywhere in the department. We’d not be chasing after paper charts or looking to multiple systems for the information. Both are real time disadvantages we’ve all experienced at other facilities.”

To that Dr. Ramaseshan added, “The efficiencies resulting from using a single database accessible by all is significant. When you have a multi-vendor solution, you find yourself closing one application to open another, or incur the expense of a second monitor to view and compare information from each application. Moving between multiple applications like this can be quite time consuming. And if you have at least 50 people—physicists, therapists, radiation oncologists, and support staff—needing to access the information, you can begin to fully understand the number hours being wasted on opening, closing, and moving between applications. With the Varian Inspiration Solution, you can very quickly go from VARiS Vision to Eclipse and back to VARiS Vision. It’s a seamless process, and the data loads very quickly.”

Scalability and upgradability were also important to the committee. A single vendor integrated solution meant a single upgrade path could advance the capabilities of the entire department. Only the interface between the Inspiration Solution in radiation therapy and Credit Valley’s Admissions, Discharges, and Transfers (ADT) interface would require a few simple changes to ensure an accurate flow of patient information.

Easy scalability would also allow the Peel Centre to quickly put into service future equipment earmarked for the three remaining radiation therapy suites. This was significant because Credit Valley maintains a high-volume onsite medical oncology practice for the region, some 1.6 million people, and growing.

The Peel Centre, upon opening, immediately needed to be seen as a regional resource for cancer treatment. That meant handling a steady flow of Credit Valley patients and those of surrounding hospitals. After one year of operation, the Peel Centre handles 1,300 to 1,400 patients annually, with that figure to increase to nearly 3,000 patients when the three original radiation suites are operating at capacity.

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Also desirable was the capacity to work remotely, initially at two nearby regional GTA West Hospitals—Trillium Health Centre and William Osler Health Centre—and eventually at other regional facilities. All remote work, including patient records, would be initiated and managed from the Peel Centre radiation therapy department.

After multiple vendor meetings, onsite visits at other cancer treatment facilities, and much internal discussion, the committee selected Varian's VARiS Vision Treatment Plan Management System, an integrated data and image management software that generates a paperless electronic health record (EHR) of a patient's entire radiation treatment process, including all information and images. Also selected was Varian's Eclipse Treatment Planning System, a comprehensive system that simplifies radiation therapy planning for all modalities, and supports select processes.

## Hardware

- Clinac 21EX Linear Accelerator: A streamlined, high performance platform that incorporates a broad range of imaging and treatment options, including dynamic motion management
- Millennium MLC™ 120: A beam shaping system that allows physicians to deliver the highest resolution general-purpose radiotherapy IMRT treatments available
- PortalVision: A fully integrated system that helps ensure treatment plan verification, accurate patient setup, effective treatment delivery, and successful patient outcomes

## Software

- Eclipse™: A comprehensive treatment planning system that simplifies the complexity of modern radiation therapy planning for all modalities
- VARiS Vision: A highly integrated treatment plan management system that maximizes a facility's ability to deliver both high patient throughput and quality patient care

## Inspiration™ Integrated Oncology Solution Peel Regional Cancer Centre

Together, the Varian radiation therapy equipment and Varian applications created a Varian Inspiration Integrated Oncology Solution that met the paperless and filmless criteria, and provided a fully integrated environment across the department. At the same time, the Varian Inspiration Solution was scalable enough to ensure the Peel Centre's ability to provide continuous high-quality, high-volume care to a burgeoning patient population within the Mississauga metro area and surrounding regions.

## Developing the Solution

An important aspect of creating a new department was establishing a clearly defined working relationship between Credit Valley and the Peel Centre, i.e., determining which procedures would be under the domain of Credit Valley and the Peel Centre, respectively. A joint committee would then work through any resulting interface issues.

## The Role of HIS and IT

Because the Peel Centre elected to go with the Varian Inspiration Solution, there were no interface issues to solve within the radiation therapy department. However, patient registration would continue to be handled through Credit Valley's Hospital Information System (HIS), which uses the ADT, or patient demographic interface, to create an electronic file during registration.

To communicate with external departments and systems, such as the Credit Valley HIS, Varian uses Information Exchange Manager (IEM), the company's integration engine that combines sophisticated logic, flexible configuration settings, and Health Level Seven (HL7) messages. HL7 is the standard supported by most health system vendors and is used in the majority of large hospitals throughout North America.

Using IEM, both outbound and inbound interfaces can be implemented using the HL7 ADT message format. Data, such as demographic, financial, schedule, provider, and lab results, can be easily shared. Using an HL7 ADT interface eliminates staff members having to enter duplicate patient registrations in VARiS applications and a hospital's HIS.

Because IEM is event-driven, patient registrations initiated through the Credit Valley's ADT interface automatically trigger messages to IEM, where they are received, interpreted, and delivered to the appropriate fields within VARI<sup>S</sup> Vision, the Peel Centre's Oncology Information System (OIS). The reverse is true for workflow initiated in VARI<sup>S</sup> Vision and sent, via IEM, to the ADT interface. In this way, the patient demographic database is continuously updated and accessible from any one or more workstations, at anytime.

Dan Sutton, the Varian Interface Analyst who established the ADT-to-VARI<sup>S</sup> Vision interface, said, "The most important work is done up front, specifically, analyzing samples of data that VARI<sup>S</sup> will be receiving from the ADT interface, as well as other needed specifications. We then build the HL7 interface accordingly. Testing is the last, and most time consuming, stage before 'going live.'" How much testing is up to the customer, as for the Peel Centre, Sutton said, "the facility conducted an extensive set of tests," to ensure its ability to immediately step into the high volume, high quality healthcare environment to which it was committed.

Sutton also noted that the IEM architecture allows for easy addition of new interfaces with little impact to existing ones. Each interface runs independently of the others and therefore can have different settings for filters, data handling, processing, and other events. Other interfaces shared by the Credit Valley HIS and the Peel Centre include scheduling and billing, which, due to Canada's nationalized healthcare system, was modified slightly to reflect time/workload data only, versus tracking time and cost data, as required for privatized healthcare.

### **Working Remotely**

The Peel Centre radiation therapy department works collaboratively and remotely with partner oncology programs at two other GTA West Hospitals located in Mississauga: Trillium Health Centre and William Ostler Health Centre.

To maintain an absolute consistency of practice between the facilities, the committee agreed that all patient records would be retained at the Peel Centre and accessible electronically to radial oncologists at the Trillium and William Ostler facilities. This decision fit strategically within the Peel Centre's desire to operate in a paperless and filmless environment.

To facilitate remote connectivity between the Peel Centre and the other facilities, the committee opted to use Varian's CITRIX<sup>®</sup> solution, which allows radial oncologists working remotely, to access in real time, the same complete patient records available to Peel Centre physicians. CITRIX would allow Trillium and William Ostler physicians to not only review patient records, including images, annotations, and authorizations, but also add their own images and information to the files.

Regarding CITRIX, Dr. McGowan stated, "Carrying paper charts between the facilities would be problematic. We needed a system that would provide reliable remote access and, ultimately, allow us to do our work from anywhere in the region. Remote access was one of the important solution components that Varian offered, and why we chose the Varian Inspiration Solution." The convenience of working remotely has also played a significant role in establishing a healthy day-to-day working relationship between the facilities.

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